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EXAMINER	
CHANG, EDITH M	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/816,409	TELLADO ET AL.	
	Examiner	Art Unit	
	Edith M. Chang	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38,40 and 41* is/are rejected.

7)☒ Claim(s) *39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20040401*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because in FIGURE 8, it is not clear the SUM is deleted or not, if the SUM is deleted where the arrow of block 830 is connected to. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1-31 are objected to because of the following informalities:

Claim 1, line 3: "the digital signal streams" should be "the plurality of digital signal streams";

line 4: "a plurality of the digital signal streams" should be "the plurality of digital signal streams";

line 6: "the transformed digital signal streams" should be "the transformed plurality of digital signal streams";

lines 6-7: "each joint processed digital signal stream" should be "each of the joint processed digital signal streams";

line 7: "digital signal streams;" should be "digital signal streams; and".

Clams 2-31, line 1: "The transceiver" should be "The Ethernet transceiver".

When "the digital signal streams" recited in the claims and lack antecedent basis should be "the plurality of digital signal streams" or its antecedent basis.

Appropriate correction is required.

3. Claims 16-17 are objected to under 37 CFR 1.75 as being a substantial duplicate of claim 15, they cover the process cross-talk of the plurality of digital signal streams wherein, the cross-talk comprises near and far cross-talk as the process cross-talk recited in the claims cover the same thing as the well-known definition of the near and far cross-talk comprised in the cross-talk. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a

slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 7-8: "other digital signal streams" does not clearly indicate which or what other digital signal streams. There are the plurality of digital signal streams, the transformed plurality of digital signal streams and the joint processed digital signal streams, the "other digital signal streams" fails distinctly claim the subject matter.

Claims 2 & 3, line 3: "the digital signal streams" does not clearly indicate which or what other digital signal streams. There are the plurality of digital signal streams, the transformed plurality of digital signal streams and the joint processed digital signal streams, the "other digital signal streams" fails distinctly claim the subject matter.

Claim 5, lines 1-2: "common sub-block transformers" does not clearly indicate that what are the common sub-block transformers, wherein in the claim 1 the transceiver comprises a domain transformer.

Claim 24, line 1: "wherein filtering coefficients of the joint processing" lacks antecedent basis.

Claim 26, line 1: "the digital signal streams" does not clearly indicate which or what other digital signal streams. There are the plurality of digital signal streams, the transformed plurality of digital signal streams and the joint processed digital signal streams, the "other digital signal streams" fails distinctly claim the subject matter.

Claim 4, 6-23, 25, and 27-31 are dependent directly or indirectly on the rejected claim 1.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 1, 32, 33, and 49-52 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In claims 1, 32, 33 and 49-52 an Ethernet (bi-directional) transceiver comprising a plurality of digital signal streams which is a non-statutory subject matter, the Ethernet transceiver comprising elements, processors etc. structuring the Ethernet transceiver. However, the Ethernet transceiver receives a plurality of digital signal streams, does not comprising signal streams.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent

granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 3-5, 18-37 and 40-52 are rejected under 35 U.S.C. 102(e) as being anticipated by Jones et al. (US 2004/0213146 A1).

Regarding **claims 1, 32, 35 & 49-52**, Jones et al. discloses in Fig.9 an Ethernet LAN bi-directional transceiver and its method ([0003] wherein the Jones et al.'s method and apparatus in multi-channel communications is in a noteworthy example of 1000BASE-T i.e. Gigabit Ethernet) receiving a plurality of digital signal streams (Rx1 to RxN on 930) in sub-blocks provided by Parallel to Serial Converter (408 Fig.4; 604 Fig.6; or 440 Fig.9), at lest one digital signal stream being coupled to another of the plurality of digital signal streams (Fig.1, wherein the interference coupling exists between 1116A & 116B or Fig.3 314 Coupling Effect H(s)), wherein the Fig.9 has elements that were described in previous figures ([0096], hence refer the previous figures i.e. Fig. 1-8 to the same numeral elements); the Ethernet transceiver comprising:

A transform block (448 Fig.9) for transforming the plurality of digital signals streams on 930 from the original domain to the frequency domain (a lower complexity domain [0070] wherein the transform unit 416 in Fig.4 i.e. 448 in Fig.9 comprises a Fast Fourier Transform (FFT) unit transferring signal streams into a lower complexity domain);

A processor (704A Fig.9) for joint processing of the transformed plurality of digital signal streams (from 916); and

An inverse transform block (720A of Fig.9, I.T.U. Inverse Transform Unit) for inverse transforming the joint processed signal streams (output of 708A) back to the original domain.

Regarding **claim 3,** inherits the limitations of claim 1, further Jones et al. discloses a sub-block provided by the Parallel to Serial Converter (408 Fig.4; 604 Fig.6; or 440 Fig.9) includes less digital signal stream samples than a block, wherein a block includes enough sample to exceed the joint filter time sample spans ([0068] wherein the sub-blocks from the de-multiplexer of the Parallel to Serial Converter has less samples to aid in processing in constraints that the original block includes enough samples to convert/exceed the processing time spans).

Regarding **claims 4, 5** & **36-37,** inherit the limitations of claim 1, further Jones et al. discloses common sub-block transformers (416 & 448 Fig.4; 448 Fig.9) for both transmit and receive joint processing.

Regarding **claim 18,** inherits the limitations of claim 1, further Jones et al. discloses at least one digital signal stream includes time domain processing (Fig.9 720A Inverse Transform Unit (I.T.U.) processing in time domain).

Regarding **claims 19, 20** & **26,** inherit the limitations of claim 1, further Jones et al. discloses the joint processing (704A Fig.9) of the transformed signal streams is performed on signal streams to be transmitted (Tx1-TxN Fig.9) and on received signal streams (Rx1-RxN on 930 provided by 916 Fig.9).

Regarding **claims 21** & **22,** inherit the limitations of claim 1, further Jones et al. discloses N digital signal streams (Rx1-RxN Fig.9), and M joint processed signal

streams (input streams to 704A Fig.9) comprising a single joint processed signal stream.

Regarding **claims 23-25** & **40,** inherit the limitations of claim 1 and claim 35 respectively, further Jones et al. discloses transforming filtering coefficients ([0010], Fig.1 108 Adaptive Canceller) wherein the adaptive canceller 108 is approximately equals H(s) interference coupling effect and is implemented as a digital filter in the discrete time domain to reduce the interference which is the purpose of the canceller.

Regarding **claims 27-31** & **44-48,** inherit the limitations of claim 1 and claim 35 respectively, further Jones et al. discloses reduction of near end cross talk ([0055] '146), far end cross talk (Fig.2, [0008] '146), alien near end cross talk (Fig.2 '146, wherein interference due to other twisted pair connections that may be proximate to the twisted pair cable of the interest, [0009] of current specification published as US 2005/0088961 A1), echo signal interference (Fig.1 '146) and inter-symbol interference (Fig.10A 1032, [0110] the last sentence that the 1032 reduce intersymbol interference '146).

Regarding **claims 33, 34** & **43**, Jones et al. discloses in Fig.11 an Ethernet transceiver ([0003] wherein the Jones et al.'s method and apparatus in multi-channel communications is in a noteworthy example of 1000BASE-T i.e. Gigabit Ethernet) receiving a plurality of digital signal streams (Rx1 to RxN on 1120) in sub-blocks provided by Parallel to Serial Converter (408 Fig.4; 604 Fig.6; or 440 Fig.9), at lest one digital signal stream being coupled to another of the plurality of digital signal streams (Fig.1, wherein the interference coupling exists between 1116A & 116B or Fig.3 314 Coupling Effect H(s)). The Fig.11 is an embodiment of an adaptive canceller having both analog domain and digital domain

cancellation capability ([0048]) and having other details as shown in FIG.9 ([0119]). Hence the Ethernet transceiver comprising:

A transform block (448 Fig.9) for transforming the plurality of digital signals streams on 930 from the original domain to the frequency domain (a lower complexity domain [0070] wherein the transform unit 416 in Fig.4 i.e. 448 in Fig.9 comprises a Fast Fourier Transform (FFT) unit transferring signal streams into a lower complexity domain);

A processor (704A Fig.9) for joint processing of the transformed plurality of digital signal streams (from 916);

An inverse transform block (720A of Fig.9, I.T.U. Inverse Transform Unit) for inverse transforming the joint processed signal streams (output of 708A) back to the original domain; and

an analog front end (1150 Fig.11) for transmitting the joint processed signal streams and receiving analog signal streams from 1124.

Regarding **claim 41**, inherits the limitations claim 35, further Jones et al. discloses a transform block (448 Fig.9) for transforming the plurality of digital signals streams on 930 from the original domain to the frequency domain (a lower complexity domain [0070] wherein the transform unit 416 in Fig.4 i.e. 448 in Fig.9 comprises a Fast Fourier Transform (FFT) unit transferring signal streams into a lower complexity domain);

Regarding **claim 42,** refer to further Jones et al. discloses the plurality of digital signal streams are transmitted over an Ethernet network ([0003] wherein the Jones et al.'s method and apparatus in multi-channel communications is in a noteworthy example of 1000BASE-T i.e. Gigabit Ethernet).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 2, 6, 8-12 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (US 2004/0213146 A1) in view of Hench (US 2006/0023645 A1).

Regarding **claims 2, 6, 8-12** & **38** inherit the limitations of claim 1, in FIG.5 Hench discloses the processing matrix (the pre-processing matrix B 510 & pro-processing matrix A 550, [0097] '645) to pre-whitening the received noise signal across multiple lines ([0057] '645). As Jones et al. multiplying samples of the transformed plurality of digital signal streams (504 Fig.5 i.e. 704 Fig.9 '146) to yields a cyclic convolution ([0081] '146), at the time of the invention was made, it would have been obvious to one of ordinary skill in the art to have the processing matrix adaptively selected to reduce interference noise (comprising ISI [0119] and cross-talk [0096] '645) to get accuracy received signals for the purpose of to reach the maximum data carrying capacity of the channel ([0058]).

Allowable Subject Matter

12. Claims 7, 13-17 and 39 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph and objections, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to teach or suggest, alone or in a combination, among other things, at least the Ethernet transceiver as a whole, the combination of elements and features, which includes the off-diagonal element of the processing matrix are adaptively selected to provide process cross-talk to cancel transmission cross-talk or sub-block filters are disabled when the coupling is below a threshold.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M. Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed H. Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
May 22, 2006

KHAI TRAN
PRIMARY EXAMINER